Residual Caprock and Fossil Salt Table of the Mount Sedom Diapir, Dead Sea basin, Israel

Israel Zak
Institute of Earth Sciences, The Hebrew University, 91904 Jerusalem, Israel

The Mount Sedom diapir, on the SW shore of the Dead Sea, emerges as an N-S trending asymmetric salt-wall, evolved parallel to the western boundary faults of the Dead Sea rift. The diapir is a simple structure, exposing steep-dipping to locally overturned slightly deformed beds of rock salt with some non-salt partings (anhydrite, gypsum, dolomite and clastics) of the Sedom Formation, a late Neogene sequence, over 2,000 m thick. Today the diapir forms a long and narrow (11 by 2 km), N-S trending hill, rising 260 m above the Dead Sea shore.

The Sedom diapir, though relatively small, provides superb exposures of a) well-bedded rock salt, overlain by b) salt-depleted residual caprock, with c) a salt table or so-called salt mirror, separating the caprock from the parent salt. These are also visible along the walls of the multitude caves and shafts of the highly developed sub-recent-present karst system, today under an arid environment. Other phenomena are d) an etched relief, tracing the facies and strike of the underlying strata. These inter-related features are unique in appearance and extension, and contribute to the understanding of primary non-salt and secondary salt-depleted evaporite facies, as well as to the interpretation of the structure, stratigraphy and deformation processes in the course of diapirism.

The diapir is topped by some 40 m of well-exposed, salt-depleted caprock, consisting of the insoluble components of the rock salt sequence, in places preserving the original stratification. A pre-Holocene, fossil dissolution surface, or salt table, separates the caprock from the underlying parent salt. The diapir is still rising at an average rate of 4mm/year, and the originally horizontal salt table is presently tilted and faulted tens of meters above Dead Sea level. The salt beds underneath are at present being dissolved by an active karst system. Where the rising salt diapir enters an active aquifer its head dissolves, and a horizontal to sub-horizontal salt table forms at its top. This dissolution surface is covered by an evolving caprock of the insoluble residue, which develops an inverse restratification, with the newer freed material accumulating underneath the protecting cover of the older freed residue.

The sedimentary and structural features of the Sedom diapir, on its various scales, are usually preserved in the salt-depleted caprock. Insoluble layers, freed from the salt matrix, continue un-interrupted across the salt table, into the overlying caprock, including their sedimentary and deformational features. Relict structures of folded salt beds appear in the caprock as folded ghosts, occasionally with the rest of the folded salt beds visible under the separating salt table.

The sedimentary and textural features of the salt-depleted caprock often resemble those of less extreme, saltless evaporites. For this reason they may be mistaken as primary deposits of the Ca-sulfate-carbonate-clastic facies.

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